



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/666,058	09/18/2003	Randy Clinton Giles	Giles 71-7-16-9	7700

7590 04/05/2005
Synnestvedt & Lechner LLP
2600 Aramark Tower
1101 Market Street
Philadelphia, PA 19107-2950

EXAMINER

STULTZ, JESSICA T

ART UNIT	PAPER NUMBER
----------	--------------

2873

DATE MAILED: 04/05/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

10/666,058

Applicant(s)

GILES ET AL.

Examiner

Jessica T. Stultz

Art Unit

2873

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 25 January 2005.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-32, 34 and 36-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-12, 14-32, 34, 36, 39 is/are rejected.
- 7) ☒ Claim(s) 13, 37 and 38 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 22 December 2004 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)
Paper No(s)/Mail Date _____.
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date. _____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

Claim 28 is objected to because of the following informalities: “fixing the position said array” should be “fixing the position of said array”. Appropriate correction is required.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-2, 9-12, 21-31, and 39 are rejected under 35 U.S.C. 102(e) as being anticipated by Solgaard et al.

Regarding claim 1, Solgaard et al discloses an optical device for discretionary treatment of channels of an optical beam, the optical device comprising: a port for at least transmitting or receiving a first beam having a plurality of channels (Section 42, wherein the port comprises input fibers “14a-c” coupled to channels “12a-c”, Figure 1); a wavelength discriminating device optically coupled to the port (Section 42, wherein the wavelength discriminating element is diffraction lens system “16” coupled to channels “12a-c”, Figure 1), the wavelength device adapted for receiving the first beam and diffracting the beam into a plurality of channel beams (Section 42, wherein the diffraction lens system “16” diffracts the beams into a plurality of channel beams, Figure 1); an array of reflective elements, the number of reflective elements exceeding the number of channels (Sections 42-43, wherein the reflective elements are mirrors

Art Unit: 2873

“46a-f”, wherein there are more mirrors and than channels, Figures 1-2), each reflective element being adapted to rotate about at least one axis, and having a first position at which the reflective element is rotated fully in one direction, a second position at which the reflective element is rotated fully in the opposite direction, and one or more intermediate positions between the first and second positions (Sections 42-43 and 60-61, wherein the mirrors “46a-f” have three tilting states, a first flat state, a second fully pulled-down state, and an intermediate halfway state, Figures 1-3); at least a portion of the reflective elements being optically coupled to the wavelength discriminating device and reflecting the channel beams (Sections 42-43, wherein the mirror are optically coupled to the diffraction lens system “16” and reflect the channel beams, Figures 1-2), at least two reflective selected elements are controllable to be positioned in said one or more intermediate positions to effect a desired output of the channel beam (Sections 42-43 and 60-61, wherein the mirrors “46a-f” reflect the beams to couple the input fibers “14a-c” to the output fibers “24a-c”, wherein the mirrors have three tilting states, a flat state, a fully pulled-down state, and a halfway state, Figures 1-3).

Regarding claim 2, Solgaard et al further discloses that at least two reflective elements are controllable to couple particular channel beams to one or more ports (Sections 42-43, wherein the reflective elements “46a-f” tilt to couple beams from ports “14a-c” to output ports “24a-c”, Figures 1-3).

Regarding claims 9-10, Solgaard et al further discloses that the array is a linear two-dimensional array (Sections 42-43 and 60-61, wherein the mirror form a linear two-dimensional array, Figures 1-3).

Regarding claim 11, Solgaard further discloses that each reflective element has a width of less than 50 micrometers (Section 51, wherein the mirror has a width of 13.3 microns, Figures 3-4).

Regarding claim 12, Solgaard al further discloses that the array of reflective elements has a linear fill density of no less than about 95 % (Shown in Figure 3, wherein the spacing between each mirror is small and therefore the mirrors have no less than about 95% fill density).

Regarding claim 21, Solgaard et al further discloses that the port is a fiber (Sections 42-43, wherein the input ports "14a-c" are fibers, Figure 1).

Regarding claim 22, Solgaard et al further discloses secondary ports wherein the ports transmit or receive secondary beam having an equal or few number of channels than the beam (Sections 42-43, wherein the secondary ports "24a-c" receive output beams from mirror array "20", Figure 1).

Regarding claim 23, Solgaard et al further discloses that at least one secondary beam is a single channel beam and at least one secondary beam is multi-channel beam (Sections 42-43, wherein the secondary beams are the beams exiting mirror array "20", which are either single or multi-channel beams, Figure 1).

Regarding claims 24-25, Solgaard further discloses that the port is an input port and the secondary ports are output ports (Section 42, wherein the ports are input ports "14a-c" and output ports "24a-c", Figure 1) or that the port is an output port and the secondary ports are import ports (Sections 42-43 and 60-61, wherein the output ports are the channels leading to import ports "24a-c", Figure 1).

Regarding claim 26, Solgaard et al further discloses that the port is an input and output port such that it transmits the beam and receives a secondary beam (Section 68, wherein the port has input port “68” and output port “80”, Figure 1).

Regarding claim 27, Solgaard et al further discloses that the wavelength discriminating device comprises a diffraction grating (Section 42, wherein the wavelength discriminating device is diffraction grating “16”, Figure 1).

Regarding claim 28, Solgaard et al discloses a method of assembling an optical device having one or more ports (Sections 42-43, wherein the optical device “10” has input ports “14a-c” and output ports “24a-c”, Figure 1), an array of reflective elements, wherein the number of reflective elements significantly exceeds the number of channels handled by the optical device (Sections 42-43, wherein the reflective elements are mirrors “46a-f”, wherein there are more mirrors than channels, Figures 1-2), each reflective element being adapted to rotate about at least one axis, and having a first position at which the reflective element is rotated fully in one direction, a second position at which the reflective element is rotated fully in the opposite direction, and one or more intermediate positions between the first and second positions (Sections 42-43 and 60-61, wherein the mirrors “46a-f” have three tilting states, a first flat state, a second fully pulled-down state, and an intermediate halfway state, Figures 1-3), the method comprising: before one or more reflective elements are aligned actively to optically couple with a desired port, fixing the position of the array of reflective elements in the optical device such that a portion of the reflective elements is in the optical path of a channel beam optically coupled to a wavelength discriminating device (Sections 42-43 and 60-61, wherein the array of mirrors “46a-c” are arranged in the optical path of the beam and coupled to wavelength discriminating device

Art Unit: 2873

“16” and wherein the mirrors are tilted to direct the beams to the desired output ports, Figures 1-3), and after said array is fixed in position relative to the optical device rotating at least two of the reflective elements of the portion to said one or more intermediate positions to optically couple the channel beam with a desired port (Sections 42-43 and 60-61, wherein sections of the mirrors are tilted to direct the beam to desired output ports “24a-c” by actuating the mirrors via an electrostatic field, Figures 1-3).

Regarding claim 29, Solgaard et al further discloses that the reflective elements are fixed in the optical device using passive alignment (Sections 42-43 and 60-61, wherein the array of mirrors are in passive alignment when in a resting position, Figures 1-3).

Regarding claim 30, Solgaard et al discloses a method of configuring an optical device for discretionary treatment of channels of an optical beam, the optical device having one or more ports (Sections 42-43, wherein the optical device “10” has input ports “14a-c” and output ports “24a-c”, Figure 1), a wavelength discriminating device optically coupled to one or more ports (Sections 42-43, wherein the wavelength discriminating device is diffraction system “16”, Figure 1), an array of reflective elements, coupled to the wavelength discriminating device (Sections 42-43, wherein the reflective elements are mirrors “46a-f” which are coupled to discriminating device “16”, Figures 1-2), each reflective element being adapted to rotate about at least one axis, and having a first position at which the reflective element is rotated fully in one direction, a second position at which the reflective element is rotated fully in the opposite direction, and one or more intermediate positions between the first and second positions (Sections 42-43 and 60-61, wherein the mirrors “46a-f” have three tilting states, a first flat state, a second fully pulled-down state, and an intermediate halfway state, Figures 1-3), wherein the number of reflective elements

Art Unit: 2873

significantly exceeds the number of channels handled by the optical device (Sections 42-43, wherein the reflective elements are mirrors “46a-f”, wherein there are more mirrors than channels, Figures 1-2), the method comprising: inputting the channel beams in the optical device such that the channel beams are incident on particular reflective elements, wherein at least one channel beam is incident on at least two reflective elements; and rotating said at least two reflective member to said one or more intermediate positions to optically couple at least a portion of the at least one channel beam to one or more ports (Sections 42-43 and 60-61, wherein selected rows of the mirrors “46a-c” are tilted to direct the beam to desired output ports “24a-c” by actuating the mirrors via an electrostatic field, Figures 1-3).

Regarding claim 31, Solgaard et al discloses a method of switching channels in an optical device having x, y, and z axes and comprising two or more ports along the y-axis, (Sections 42-43, wherein the optical device “10” has x, y, and z axes and output ports “24a-c” are aligned on the y axis, Figure 1), a wavelength discriminating device optically coupled to one or more ports (Sections 42-43, wherein the wavelength discriminating device is diffraction system “16”, Figure 1), an array of reflective elements (Sections 42-43, wherein the reflective elements are mirrors “46a-f”, which are coupled to discriminating device “16”, Figures 1-2), each reflective element being adapted to rotate about at least one axis, and having a first position at which the reflective element is rotated fully in one direction, a second position at which the reflective element is rotated fully in the opposite direction, and one or more intermediate positions between the first and second positions (Sections 42-43 and 60-61, wherein the mirrors “46a-f” have three tilting states, a first flat state, a second fully pulled-down state, and an intermediate halfway state, Figures 1-3), at least a portion of the reflective elements being optically coupled to the

Art Unit: 2873

wavelength discriminating device to reflect the channel beams (Sections 42-43, wherein the device "16" is coupled to reflective elements "46a-c", Figure 1), at least two reflective elements of the portion corresponding to a particular channel beam, the method comprising: rotating said at least two reflective elements to one or more intermediate positions to switch the coupling of the particular channel beam from one port to another port along the y-axis (Sections 42-43 and 60-61, wherein sections of the mirrors are tilted to direct the beam to desired output ports "24a-c" by actuating the mirrors via an electrostatic field, wherein the mirrors are titled to three different states including an intermediate state, Figures 1-3).

Regarding claim 39, Solgaard et al further discloses that the reflective element is adapted to be positioned in any intermediate position between the first and second positions (Sections 42-43 and 60-61, wherein the mirrors are individually controlled to couple the input fibers "14a-c" to the output fibers "24a-c", wherein the mirrors have three states that vary between the rows of mirrors and therefore the mirrors are positioned in any intermediate position between the first and second positions, Figures 1-3).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 3-8, 14-20, 32, 34, and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Solgaard et al in view of Moon et al.

Regarding claims 3-5, Solgaard et al discloses an optical device as shown above wherein the optical device has x, y, and z axes, wherein the z axis is along the optical axis, (Figure 1), wherein the reflective elements rotate about an axis (Sections 42-43 and 60-61, Figure 1), but does not specifically disclose that the reflective elements are controllable to move in one of three directions: a first direction wherein the element is rotated about the y axis, a second direction wherein the reflective element is rotated about an axis parallel to the x axis, and a third direction in which the reflective element is moved along the z axis; or in all three directions. Moon et al teaches of an optical device having multiple ports (Sections 101 and 104-106, wherein the optical device is filter "10" and the input port "18" receives beam "17" which has multiple channels "28", Figures 1-3), a wavelength discriminating device (Sections 104-106, wherein the wavelength discriminating element is diffraction grating "30" which is coupled to port "18" by optical fiber "22" and tube "24", Figures 1-3), and an array of reflective elements (Sections 104-108, wherein the reflective elements are micro-mirrors "52" of micro-mirror device "50", Figures 1-3), specifically wherein the reflective elements are controllable to move in one of three directions: a first direction wherein the element is rotated about the y axis, a second direction wherein the reflective element is rotated about an axis parallel to the x axis, and a third direction in which the reflective element is moved along the z axis; or in all three directions for the purpose of operating the mirrors in a digital manner to properly direction the beam of light passing through the device (Section 108, wherein the mirrors "52" are rotated along axis "51", perpendicular to the spectral axis "55" and wherein the micro-mirrors may flip about any axis, Figures 1-4). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the reflective elements of Solgaard et al to further be

controllable to move in one of three directions: a first direction wherein the element is rotated about the y axis, a second direction wherein the reflective element is rotated about an axis parallel to the x axis, and a third direction in which the reflective element is moved along the z axis; or in all three directions since Moon et al teaches of an optical device having multiple ports, a wavelength discriminating device, and an array of reflective elements, specifically wherein the reflective elements are controllable to move in one of three directions: a first direction wherein the element is rotated about the y axis, a second direction wherein the reflective element is rotated about an axis parallel to the x axis, and a third direction in which the reflective element is moved along the z axis; or in all three directions for the purpose of operating the mirrors in a digital manner to properly direction the beam of light passing through the device.

Regarding claim 6, Solgaard et al and Moon et al disclose and teach of an optical device as shown above and Solgaard et al further teaches that the device discloses secondary ports aligned with the y-axis (Sections 42-43, wherein the secondary ports are output fibers "24a-c" which are aligned along the y-axis, Figure 1), wherein a certain movement of said at least two reflective elements about an axis parallel to the x-axis causes a channel beam to couple with a port along the y-axis (Sections 42-43 and 60-61, wherein the mirrors "46a-f" are controllable to couple the input beam to the output fibers "25a-c", Figure 1).

Regarding claim 7, Solgaard et al and Moon et al disclose and teach of an optical device as disclosed above and Solgaard et al further discloses that certain movement of said at least two reflective elements about an axis parallel to the x-axis causes a channel beam to switch from one port to a different port along the y axis (Sections 42-43 and 60-61, wherein the mirrors "46a-f"

Art Unit: 2873

are controllable to tilt along an axis and to couple the input beam to respective output fibers "25a-c" along the y-axis, Figure 1).

Regarding claim 8, Solgaard et al and Moon et al disclose and teach of an optical device as disclosed above and Moon et al further teaches that a certain movement of said at least two reflective mirrors about the y-axis produces a group delay profile in the channel beam for the purpose of providing an output signal of the desired attenuation to the desired output port (Sections 104-108, wherein the mirrors "52" are rotated along axis "51", perpendicular to the spectral axis "55" and wherein the micro-mirrors may flip about any axis and wherein selected sections of the mirrors "52" are rotated to achieve the desired delay profile of output signal "38" and to direct the channel beams to the output port "20", Figures 1-3 and 7). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the optical device of Solgaard et al to further include a certain movement of said at least two reflective mirrors about the y-axis produces a group delay profile in the channel beam since Moon et al further teaches that a certain movement of said at least two reflective mirrors about the y-axis produces a group delay profile in the channel beam for the purpose of providing an output signal of the desired attenuation to the desired output port.

Regarding claim 14-16 and 19-20, Solgaard et al discloses an optical device as shown above wherein the mirrors are tiltable to three different positions (Section 108), but does not specifically disclose that the reflective elements are configured in a first way wherein at least a portion of the reflective elements receive a channel beam from the wavelength discriminating device, a second way wherein at least a portion of the reflective elements reflect the channel beams to the wavelength discriminated device for combining into the first beam, and a third way

Art Unit: 2873

in which a different portion of the reflective elements reflect a portion of the channel beam to the wavelength discriminating device for combining into a second beam having fewer channel than the first beam, wherein the elements are configured in the first and third way, only the first way, only the second way, or only the third way. Moon et al teaches that the reflective elements are configured in a first way wherein at least a portion of the reflective elements receive a channel beam from the wavelength discriminating device (Sections 104-108, wherein the reflective elements "52" receive beams "32" from the wavelength discriminating device "30", Figures 1-3), a second way wherein at least a portion of the reflective elements reflect the channel beams to the wavelength discriminated device for combining into the first beam (Sections 104-108, wherein at least a portion of the elements "52" reflect the channel beams "32" to form beams "53", which combine to form a first beam to exit at outputs "19" and "20", Figures 1-3), and a third way in which a different portion of the reflective elements reflect a portion of the channel beam to the wavelength discriminating device for combining into a second beam having fewer channel than the first beam (104-108, wherein the channels are selectively attenuated by the mirrors "52" to form a desired gain profile of the output signal "38", Figures 1-3) wherein the reflective elements are configured in the first and third way (Sections 104-108, wherein the channels are selectively attenuated by the tilting some of the mirrors "52" to form a desired gain profile of the output signal "38", wherein the reflected beams "53" combine to from the signal "38" and the reflected beams "56" are directed out of the return path, Figures 1-3) or the reflective elements are configured in the first way only (Sections 104-108, wherein the micro-mirrors are all tilted and the beams "56" are all reflected outside of the return path, Figures 1-3), or the reflective elements are configured in the second way only (Sections 104-108, wherein the

Art Unit: 2873

none of the micro-mirrors are tilted and all of the beams "32" reflect back into the return path, Figures 1-3) for the purpose of operating the mirrors in a digital manner to properly direct the beam of light passing through the device (Section 108, wherein the mirrors "52" are rotated along axis "51", perpendicular to the spectral axis "55" and wherein the micro-mirrors may flip about any axis, Figures 1-4). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the optical device of Solgaard et al to further include the reflective elements configured in a first way wherein at least a portion of the reflective elements receive a channel beam from the wavelength discriminating device, a second way wherein at least a portion of the reflective elements reflect the channel beams to the wavelength discriminated device for combining into the first beam, and a third way in which a different portion of the reflective elements reflect a portion of the channel beam to the wavelength discriminating device for combining into a second beam having fewer channel than the first beam, wherein the elements are configured in the first and third way, only the first way, only the second way, or only the third way since Moon et al teaches that the reflective elements are configured in a first way wherein at least a portion of the reflective elements receive a channel beam from the wavelength discriminating device, a second way wherein at least a portion of the reflective elements reflect the channel beams to the wavelength discriminated device for combining into the first beam, and a third way in which a different portion of the reflective elements reflect a portion of the channel beam to the wavelength discriminating device for combining into a second beam having fewer channel than the first beam, wherein the reflective elements are configured in the first and third way, or the reflective elements are configured in the first way only, or the reflective elements are configured in the second way

only, for the purpose of operating the mirrors in a digital manner to properly direct the beam of light passing through the device.

Regarding claim 17, Solgaard et al and Moon et al disclose and teach of an optical device as disclosed above and Solgaard al further discloses that the wavelength discriminating device is not in the optical path between the reflective elements and the secondary ports (Sections 42-43, wherein a wavelength discriminating device “16” is not between the mirrors “46a-c” and the output ports “24a-c”, Figures 1 and 6).

Regarding claim 18, Solgaard et al and Moon et al disclose and teach of an optical device as disclosed above and Solgaard al further discloses that the wavelength discriminating device is in the optical path between the reflective elements and the secondary ports (Sections 42-43, wherein a wavelength discriminating device “22” is between the mirrors “46a-c” and the output ports “24a-c”, Figure 1).

Regarding claims 32, 34, and 36, Solgaard et al discloses a method of switching channels in an optical device having x, y, and z axes and comprising two or more ports along the y-axis, (Sections 42-43, wherein the optical device “10” has x, y, and z axes and output ports “24a-c” are aligned on the y axis, Figure 1), a wavelength discriminating device optically coupled to one or more ports (Sections 42-43, wherein the wavelength discriminating device is diffraction system “16”, Figure 1), an array of reflective elements (Sections 42-43, wherein the reflective elements are mirrors “46a-f”, are coupled to discriminating device “16”, Figures 1-2), each reflective element being adapted to rotate about at least one axis, and having a first position at which the reflective element is rotated fully in one direction, a second position at which the reflective element is rotated fully in the opposite direction, and one or more intermediate positions between

Art Unit: 2873

the first and second positions (Sections 42-43 and 60-61, wherein the mirrors “46a-f” can be tilted to half of their maximum angles and wherein the mirrors have three tilting states, a first flat state, a second fully pulled-down state, and an intermediate halfway state, Figures 1-3), at least a portion of the reflective elements being optically coupled to the wavelength discriminating device (Sections 42-43, wherein the device “16” is coupled to reflective elements “46a-c”, Figure 1), and at least two reflective elements of the portion corresponding to a particular channel beam, the method comprising: rotating said a first selection of at least two reflective elements, comprising at least one common element (Sections 60-61, wherein the rows of mirrors are tilted to correspond to the desired channel beam, Figures 1-3), to one or more intermediate positions (Sections 42-43 and 60-61, wherein sections of the mirrors are tilted to direct the beam to desired output ports “24a-c” by actuating the mirrors via an electrostatic field, wherein the mirrors are tilted to three different states including an intermediate state, Figures 1-3), but does not specifically disclose that the mirrors are move to produce a desired group delay profile for a particular channel beam, or that the reflective element is adapted to rotate about a second axis, to a third or fourth position when fully rotated or an intermediate position to achieve a desired switching function. Moon et al teaches of an optical device having multiple ports (Sections 101 and 104-106, wherein the optical device is filter “10” and the input port “18” receives beam “17” which has multiple channels “28”, Figures 1-3), a wavelength discriminating device (Sections 104-106, wherein the wavelength discriminating element is diffraction grating “30” which is coupled to port “18” by optical fiber “22” and tube “24”, Figures 1-3), and an array of reflective elements (Sections 104-108, wherein the reflective elements are micro-mirrors “52” of micro-mirror device “50”, Figures 1-3), specifically wherein the reflective elements are controllable to

Art Unit: 2873

move in one of three directions: a first direction wherein the element is rotated about the y axis, a second direction wherein the reflective element is rotated about an axis parallel to the x axis, and a third direction in which the reflective element is moved along the z axis; (Section 108, wherein the mirrors "52" are rotated along axis "51", perpendicular to the spectral axis "55" and wherein the micro-mirrors may flip about any axis, Figures 1-4), wherein rotation of the reflective mirrors produces a group delay profile in the channel beam to perform the desired switching for the purpose of providing an output signal of the desired attenuation to the desired output port (Sections 104-108, wherein the mirrors "52" are rotated along axis "51", perpendicular to the spectral axis "55" and wherein the micro-mirrors may flip about any axis and wherein selected sections of the mirrors "52" are rotated to achieve the desired delay profile of output signal "38" and to direct the channel beams to the output port "20", Figures 1-3 and 7). Therefore it would have been obvious to one having ordinary skill in the art at the time the invention was made for the optical device of Solgaard et al to further include moving the mirrors to produce a desired group delay profile for a particular channel beam, wherein the reflective element is adapted to rotate about a second axis, to a third or fourth position when fully rotated or an intermediate position to achieve a desired switching function since Moon et al teaches of an optical device having multiple ports, a wavelength discriminating device, and an array of reflective elements, specifically wherein the reflective elements are controllable to move in one of three directions: a first direction wherein the element is rotated about the y axis, a second direction wherein the reflective element is rotated about an axis parallel to the x axis, and a third direction in which the reflective element is moved along the z axis, wherein rotation of the reflective mirrors produces a

Art Unit: 2873

group delay profile in the channel beam to perform the desired switching for the purpose of providing an output signal of the desired attenuation to the desired output port.

Response to Arguments

Applicant's arguments with respect to claims 1-34 have been considered but are moot in view of the new ground(s) of rejection as shown above.

Allowable Subject Matter

Claims 13, 37-38 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

The following is an examiner's statement of reasons for allowable subject matter: none of the prior art alone or in combination disclose or teach of the claimed combination of limitations to warrant a rejection under 35 USC 102 or 103.

Specifically regarding claims 13 and 37-38, none of the prior art alone or in combination disclose or teach of an optical device or method of configuring an optical device or switching channels in an optical device as disclosed above, specifically wherein the spacing between adjacent reflective elements is determined by the claimed equation.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO**

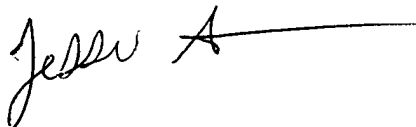
Art Unit: 2873

MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jessica T. Stultz whose telephone number is (571) 272-2339. The examiner can normally be reached on M-F 8-4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Georgia Epps can be reached on 571-272-2328. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Jessica Stultz
Patent Examiner
AU 2873
March 29, 2005



JORDAN SCHWARTZ
PRIMARY EXAMINER